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OPTIMAL TRAJECTORY IN $mathbbR^2$ UNDER OBSERVATION

V. I. Berdyshev, V. B. Kostousov, A. A. Popov

We study the problem of forming a trajectory in a given "corridor" from $\mathbb{R}^2$ such that the minimum distance form this trajectory to observers is maximal. Each observer is located outside the corridor and has an open convex observation cone overlapping the corridor. The positions of the observers and the cones are fixed. An observer can measure the distance to an object moving along the trajectory when the object is inside its cone. We describe an "optimal corridor," i.e., the set of all optimal trajectories with given initial and terminal points. A similar problem is solved in the case when the moving object is a solid body, more exactly, a disk. For practical calculations, we propose algorithms that construct an optimal corridor and a shortest optimal trajectory for a solid object in a discrete statement. The initial continuous conditions of the problem, such as the boundaries of the corridor and the observation cones, are projected onto a discrete regular grid, and a discrete realization of the optimal corridor and its boundaries are constructed on the grid in the form of 8-connected sequences of grid nodes. The shortest optimal trajectory of the solid object is found using Dijkstra's algorithm.

Keywords: moving object, observer, optimal trajectory, shortest path.

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Vitalii Ivanovich Berdyshev, RAS Academician, Krasovskii Institute of Mathematics and Mechanics, Ural Branch of the Russian Academy of Sciences, Yekaterinburg, 620990 Russia,
e-mail: bvi@imm.uran.ru .
Viktor Borisovich Kostousov, Cand. Sci. (Phys.-Math.), Krasovskii Institute of Mathematics and Mechanics, Ural Branch of the Russian Academy of Sciences, Yekaterinburg, 620990 Russia,
e-mail: vkost@imm.uran.ru .
Aleksandr Andreevich Popov, Krasovskii Institute of Mathematics and Mechanics, Ural Branch of the Russian Academy of Sciences, Yekaterinburg, 620990 Russia,
e-mail: aap@imm.uran.ru .

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